

## REMARKS

In the office action, the Examiner (1) rejected Claims 1-24 and 49-53 under 35 U.S.C. § 101, (2) rejected Claims 25-48 under 35 U.S.C. § 112, second paragraph, (3) rejected Claims 1-4, 13, 14, 23, 25-27, 31, 32, 36 and 37 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,843,378 issued to el-Hage et al. ("el-Hage"), (4) rejected Claims 1-3, 8-10, 13, 21, 25 and 33 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,131,512 issued to Verlinden et al. ("Verlinden"), and (5) rejected Claims 1-4, 6, 8, 9, 13, 14, 25-27, 29, 31, 32, 36, 37, 44 and 46 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,212,949 issued to Inder et al. ("Inder").  
Reconsideration and allowance of the application, as amended, are requested.

### I. § 101 and § 112, second paragraph, Rejections

The Examiner initially rejected Claims 1-24 and 49-53, stating that the claims do not set forth any steps involved in the method, and that it is unclear what method Applicant is intending to encompass.

Independent Claim 1 of the application is directed to a method of determining which pin locations in a printhead of a microarray spotting instrument are occupied by fluid dispensing pins. The claim sets forth three particular steps for carrying out this method: (1) providing a printhead of a microarray spotting instrument, said printhead including a plurality of pin locations at each of which a fluid dispensing pin is releasably or movably positionable; (2) providing a pin detection apparatus; and (3) using the pin detection apparatus to automatically detect whether a pin is present at each pin location. The claim preamble specifies the method intended to be encompassed, i.e., determining which pin locations in a printhead of a microarray spotting instrument are occupied by fluid dispensing pins, and the steps needed to accomplish the method. The specified steps include the step of automatically detecting the presence of a pin at each pin location, and doing so using a pin detection apparatus.

Further dependent claims specify further details on the pin detection apparatus. In addition, further dependent claims (such as Claims 18 and 19) specify further details on using the pin detection apparatus. It is thus submitted that Claim 1 and dependent Claims 2-24 are definite, and the claim rejection should be withdrawn.

Independent Claim 49 is directed to a method of providing to a controller operating a microarray spotting instrument information on which pin locations in a printhead in the instrument are occupied by fluid dispensing pins. The following particular steps are specified for carrying out this method: (1) providing a printhead having a plurality of pin locations at which pins are movably or releasably positionable; (2) automatically sensing whether a pin is present in a pin location and generating a signal indicative thereof; and (3) transmitting the signal to the controller. It is respectfully submitted that both the method intended to be encompassed and the steps for accomplishing the method are particularly specified.

Independent Claim 50 is directed to a method of printing on a substrate and determining whether a pin in a printhead of a microarray spotting instrument is stuck in a raised position. The claim specifies the following particular steps for carrying out this method: (1) dipping tips of pins mounted in the pinhead into a reservoir of target material; (2) positioning the printhead over a microarray substrate to be spotted; (3) lowering the printhead to bring the tips of the pins into contact with the substrate to print spots on the substrate and, in the process, moving the pins in the printhead into raised positions relative to the printhead; (4) raising the printhead to separate the pins from the substrate; and (5) using a pin detection apparatus to automatically detect whether a pin in the printhead is stuck in a raised position. It is respectfully submitted that both the method intended to be encompassed and the steps for accomplishing the method are particularly specified by Claim 50.

The Examiner stated that Claims 25-48 are indefinite. The Examiner states that in Claims 25 and 48, Applicant has claimed an apparatus for determining pin locations comprised of a sensor, but has not claimed any pins, and therefore, it is unclear what is to be detected and how the detection will be achieved. Independent Claim 48 is directed to a microarray spotting instrument, and has been amended to clarify that the instrument includes a plurality of fluid dispensing pins. The rejection of Claim 48 should therefore be withdrawn.

Independent Claim 25 is directed to an apparatus for determining which pin locations in a printhead of a microarray spotting instrument are occupied by fluid dispensing pins. As the claim specifies, the apparatus includes at least one sensor element to automatically detect whether a fluid dispensing pin is present in each pin location. The claim is directed to an apparatus for determining pin locations in microarray spotting instrument printheads; the claim is not directed to a microarray spotting instrument itself. Accordingly, the claim does not specify that the apparatus itself includes any pins. It is therefore submitted that the claim is definite, and the rejections of Claim 25 and dependent Claims 26-47 should be withdrawn.

## II. § 102 Rejections

In rejecting Claims 1-4, 6, 8, 9, 13, 14, 25-27, 29, 31, 32, 36, 37, 44 and 46 as being anticipated by el-Hage, the Examiner stated that el-Hage discloses a circuit board (46) that is used to register the end of a rod (30), and which detects the location of the rod based on whether it is present in a hole of the circuit board.

El-Hage discloses a probe for aspirating and dispensing liquid. The probe (10) includes an electrically conductive fluid conduit (26) and an electrically conductive rod (30), which are fixedly embedded in an electrically insulative tube (18). The probe is attached to board (46). The apparatus can sense when the end (40) of the conduit (26) is

immersed in liquid. The apparatus does not detect whether the rod is present in a hole of the circuit board.

Independent Claim 1 is directed to a method of determining which pin locations in a printhead of a microarray spotting instrument are occupied by fluid dispensing pins. The method includes the steps of providing a printhead of a microarray spotting instrument, said printhead including a plurality of pin locations, at each of which a fluid dispensing pin is releasably or movably positionable; and, for each pin location, using a pin detection apparatus to automatically detect whether a fluid dispensing pin is present at the pin location. El-Hage does not relate to microarray spotting instruments, and accordingly does not disclose or suggest providing such an instrument, much less one with a plurality of pin locations. Furthermore, el-Hage does not disclose or suggest using a pin detection apparatus to automatically detect whether fluid dispensing pins (much less fluid dispensing pins that are releasably or movably positionable) are present in their respective plurality of pin locations. Claim 1 and Claims 2-24, which depend thereon, are patentable over el-Hage.

Independent Claim 25 is directed to an apparatus for determining which pin locations in a printhead of a microarray spotting instrument are occupied by fluid dispensing pins, comprising at least one sensor element to automatically detect whether a fluid dispensing pin is present in each said pin location. This claim is distinguishable over el-Hage because el-Hage does not disclose or suggest any sensor element to automatically detect whether a releasably or movably mounted fluid dispensing pin is present anywhere, much less in each of a plurality of pin locations of a printhead of a microarray spotting instrument. Claim 25 and Claims 26-47, which are dependent thereon, are thus patentable over el-Hage.

In rejecting Claims 1-3, 8-10, 13, 21, 25 and 33 as being anticipated by Verlinden, the Examiner stated that Verlinden teaches use of a strain gauge to determine the

orientation of a printing master relative to a base, and that in using the strain gauge, one would have to detect the pin location of pins that are part of the base plate.

Verlinden discloses use of strain gauges for adjusting the registration of printing masters in a printing press. The Examiner contends that the strain gauge include pins which are part of the base plate. It appears that the Examiner is referring to the register pins of the leading pin bar of the plate cylinder as described in col. 3, lines 65-67. This however does not teach or suggest any of the claimed subject matter. With respect to Claim 1, Verlinden does not relate to microarray spotting instruments, and accordingly does not disclose or suggest providing such an instrument with a plurality of pin locations, at which fluid dispensing pins are releasably or movably positionable. Furthermore, Verlinden does not disclose or suggest using a pin detection apparatus to automatically detect whether fluid dispensing pins are present in their respective pin locations. Verlinden discloses use of strain gauges for the purpose of determining whether the base has deformed or shifted; the strain gauges are not used for detecting the presence of any pins, much less fluid dispensing pins. As can be best determined, the pins of Verlinden's leading pin bar are fixed, and accordingly it would also not be suggested to one skilled in the art to attempt to determine whether movably or releasably positionable pins are present in respective pin locations given that they are fixed relative to those locations. Claim 1 and Claims 2-24, which depend thereon, are patentable over Verlinden.

With respect to Claim 25, Verlinden does not disclose or suggest any sensor element to automatically detect whether a fluid dispensing pin is present anywhere, much less in each of a plurality of pin locations of a printhead of a microarray spotting instrument. Claim 25 and Claims 26-47, which are dependent thereon, are thus patentable over Verlinden.

The Examiner stated that Inder teaches a fluid level sensor with aspirator tips (6). The Examiner contends that if fluid is aspirated, electrodes arranged along the fluid path sense fluid, which must mean that the tips are in the fluid - which gives the location of the tips.

As with the other references, the rejected claims are patentable over Inder. Inder discloses a device having a plurality of fluid aspirator tips (6) that aspirate fluids from cells (15). The device senses the presence of fluid in the cells. The aspirator tips (6) appear to be fixedly attached to the device. Inder does not sense the presence or absence of the tips given that they are fixed. Inder also does not relate to microarray spotting instruments. More particularly, with respect to independent Claim 1, Inder does not disclose or suggest providing a printhead of a microarray spotting instrument, much less a printhead including a plurality of pin locations, at each of which a fluid dispensing pin is releasably or movably positionable. Furthermore, Inder does not disclose or suggest for each pin location, using the pin detection apparatus to automatically detect whether a fluid dispensing pin is present at that location. Claim 1 and dependent Claims 2-24 are thus patentable over Inder.

With respect to Claim 25, Inder does not disclose or suggest an apparatus for determining which pin locations in a printhead of a microarray spotting instrument are occupied by releasably or movably mounted fluid dispensing pins. Inder does not disclose any sensor element that automatically detects whether a fluid dispensing pin is present in each of the pin locations. Claim 25 and dependent Claims 26-47 are thus patentable over Inder.

Application Serial No. 09/527,892  
Amendment dated October 21, 2003  
Reply to Office Action dated July 8, 2003

Claims 1-53 are pending in the present application. As the application is now believed to be in condition for allowance, issuance of a Notice of Allowance is respectfully requested.

Respectfully submitted,



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October 21, 2003